

CLAIMS

What is claimed is:

1. An imaging apparatus comprising:

a first set of diffractive light modulators along a column of a light modulator array;

5 and

a second set of diffractive light modulators along a row of the light modulator array, the diffractive light modulators in the second set being arranged such that optically active areas along the row are spaced apart.
2. The apparatus of claim 1 wherein the diffractive light modulators in the first set
10 and the second set comprise ribbon light modulators.
3. The apparatus of claim 1 further comprising:

a light source configured to shine a light beam onto the light modulator array, the light modulator array being configured to modulate the light beam on to a substrate.
4. The apparatus of claim 3 further comprising a projection lens over the substrate.
- 15 5. The apparatus of claim 1 further comprising a microlens array and wherein the light modulator array and the microlens array are in a same integrated packaging.
6. The apparatus of claim 1 wherein a spacing between diffractive light modulators in the first set is different from a spacing between diffractive light modulators in the second set.

7. The apparatus of claim 1 wherein a spacing between diffractive light modulators in the first set is substantially the same as a spacing between diffractive light modulators in the second set.

8. The apparatus of claim 1 wherein optically active areas in the light modulator

5 array have a repeating pattern.

9. The apparatus of claim 8 wherein the repeating pattern comprises a rectangular pattern.

10. The apparatus of claim 1 wherein diffractive light modulators in the second set have a pitch that is at least twice the size of an optically active area of a diffractive light
10 modulator in the light modulator array.

11. A method of imprinting a pattern on a substrate without using a mask, the method comprising:

imprinting a first pixel of the pattern on the substrate at a first time period; and

imprinting a second pixel of the pattern on the substrate at the first time period,

15 the first pixel and the second pixel being from adjacent diffractive light modulators in a light modulator array along a scanning direction, the first pixel and the second pixel not touching one another on the substrate.

12. The method of claim 11 wherein the light modulator array comprises a loosely-packed diffractive light modulator array.

20 13. The method of claim 11 further comprising:

imprinting a third pixel of the pattern on the wafer at the first time period, wherein the first pixel, the second pixel, and the third pixel are part of a repeating pattern.

14. The method of claim 13 wherein the repeating pattern comprises a rectangular pattern.

15. The method of claim 11 wherein the substrate comprises a semiconductor wafer.

16. A lithography system comprising:

5 a light modulator array comprising a plurality of diffractive light modulators arranged in columns, the diffractive light modulators within the columns having a first pitch and the columns being spaced according to a second pitch; and

a lens configured to project modulated light from the light modulator onto a substrate being patterned.

10 17. The lithography system of claim 16 wherein the first pitch is greater than the second pitch.

18. The lithography system of claim 16 wherein the first pitch is at least two times the size of an optically active area of a diffractive light modulator in the light modulator array.

15 19. The lithography system of claim 16 wherein the first pitch is substantially the same as the second pitch.

20. The lithography system of claim 16 further comprising a microlens array in a same packaging as the light modulator array.